National Geodetic Survey Positioning America for the Future

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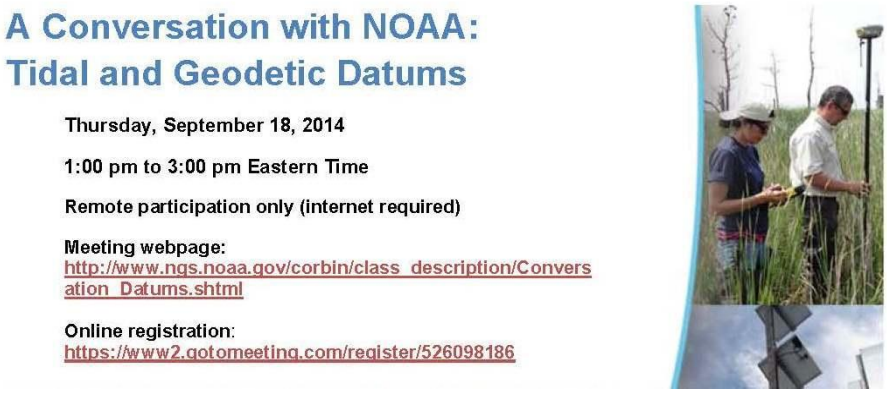
1. A Conversation with NOAA: Tidal and Geodetic Datums

On September 18th, NGS ECO facilitated the first of a planned three-part training series to support coastal resiliency by improving general understanding and application of high accuracy coastal elevations and water levels. The training series will be developed in collaboration with the Center for Operational Oceanographic Products and Services (CO-OPS) and the Office of Coast Survey (OCS). Entitled "A Conversation with NOAA; Tidal and Geodetic Datums," the two-hour webinar allowed a wide range of NOAA partners to engage datums experts regarding the derivation and use of vertical datums. The participants were encouraged to view a set of extensive, videos on tidal and geodetic datums, available on the NGS Training Center web page, prior to attending the Conversation with NOAA webinar. Seventy attendees representing the Sentinel Site Cooperatives, the National Estuarine Research Reserve System, National Park Service, US Army Corps of Engineers, the State of Alaska and many others organizations, asked a variety of questions, including how to address accuracy of local survey data, how to survey to a non-NOAA tide gauge, and how to access NOAA data. The two subsequent training modules, to be delivered in 2015, will instruct users on techniques for deriving local tidal datums from their own water level records. These techniques will include using simultaneous datum comparison and generating local tidal datums.



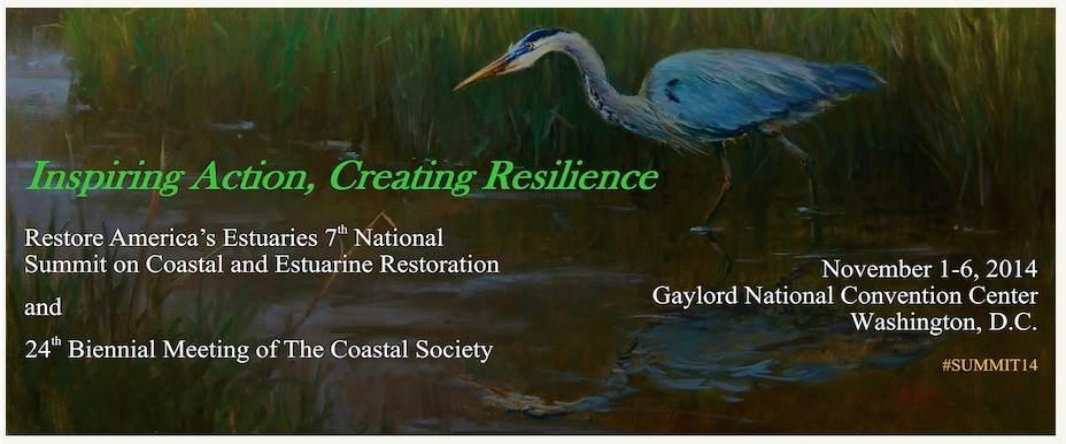
2. NGS tests a new river crossing procedure at Ocean City Inlet

The week of September 22nd, NGS ECO assisted the NGS Instrumentation and Methodolgy Branch with a field trial of recently developed procedures for transferring high-precision height information over natural obstacles, such as rivers or valleys. Existing river or valley crossing procedures require highly-specialized instruments that are no longer commercially available. The newly developed procedures will enable river or valley crossings to be conducted much faster than in the past by using modern high-precision total stations.

The Ocean City inlet separating Ocean City, MD from the north end of Assateague Island National Seashore, which is managed by the National Park Service, provided an excellent opportunity to test the new instrumentation and procedures. The size and shape of the inlet, which measures over 300 m across, was ideal for the test. Conducting the test at Ocean City also helped support the National Park Service's need for vertical control at the north end of the National Seashore. During the field trial, heights were transferred from published bench marks at Ocean City, across the Ocean City Inlet to a newly installed deep rod mark at the north end of Assateague Island. In the weeks prior to the river crossing, NGS ECO and NPS staff established the deep rod mark at the north end of the island, and leveled between existing marks at Ocean City to provide the leveled connection to temporary points set on either side of the inlet for the survey. Currently, NGS staff are analyzing the data, and are developing strategies for bluebooking the results using the new instrumentation and methodology.

3. Chesapeake Bay Sentinel Site Cooperative chairs a session at 2014 Restore America's Estuaries Meeting

The Chesapeake Bay Sentinel Site Cooperative (CBSSC) had a dedicated session at the Restore America's Estuaries conference on November 4 in Washington D.C. The session showcased several applications of the use of geospatial infrastructure to support the sea level change "sentinel site" concept. Christine Gallagher, in her first week back at ECO after a rotational assignment at the NOAA Budget Office (welcome back Christine!), chaired the session which was broadly attended by many sentinel site partners. Philippe Hensel gave a brief overview of the sentinel site cooperative concept and highlighted CBSSC's contributions to a regional, comprehensive surface elevation table (SET) metadata inventory and showed how the metadata can be used. Pati Delgado, the director of the Jug Bay Wetlands Sanctuary, showed how the vertical connections between a local water level recorder and permanent wetland vegetation plots can be used to test specific hypotheses relating to the tolerance of wetland vegetation to inundation. Galen Scott, presenting for Laura Mitchell from US Fish & Wildlife Service, showed how Real Time Kinematic GPS (RTK) is being used to monitor sub-centimeter wetland elevation change across the hundreds of thousands of hectares that comprises the Blackwater National Wildlife Refuge. Focusing further on water levels, our colleague from CO-OPS, Chris Paternostro, gave a talk highlighting how CO-OPS has been, on a project-by-project basis, supporting sentinel site objectives for many years in the Chesapeake Bay. Chris underlined the complexities involved with having CO-OPS analyze partner-submitted water levels, and why we really need the user community to push for the development of an open-source alternative for tidal datum calculations. Linda Blum, from University of Virginia and the Virginia Coastal Reserve LTER showed how several of her students have been exploring the use of *Kosteletzkya pentacarpos* (Marsh Pink/Marsh Mallow) as an agricultural crop in fields that are being affected by local sea level rise and are being flooded by brackish water. The study presented at the meeting focused on the success of different planting/seeding strategies. The session was very well attended, and the audience provided engaging questions.



4. In case you missed it!

- The "built infrastructure" sentinel site working group has narrowed its focus on potential pilot project locations to consider the Hampton Roads area (including the CBNERR-VA), the Choptank River/Cambridge/Blackwater NWR area (MD), the Annapolis Coastal Community, and Tangier Sound. The working group will soon decide which initial locations to build out as pilot projects in 2015.
- On September 15th, NGS ECO hosted a discussion on subsidence monitoring with staff from NASA's Langley research Center and Alan Dragoo of Maser Consulting. NASA has hired Maser Consulting to help it monitor subsidence at its Langley campus in the Hampton Roads area.
- On September 19th, NGS ECO gave a 2-hour lecture on NOAA science and the Sentinel Site Program at a VA Association of Surveyors seminar on Sea Level Rise and Subsidence in Newport News, VA. The seminar focused on increased inundation from sea level rise and local subsidence, and how the surveying community can respond to these changing heights and water levels. The powerpoint is available to download from the NGS Presentations Library.
- NGS assisted CO-OPS in their Coastal Inundation Landmark project by providing high accuracy GPS-based positions on numerous landmarks in Lower Manhattan, NY. This project aims to provide vertical references for the National Weather Service's coastal flooding warnings - references that make intuitive sense to local coastal populations. The project is a wonderful example of how accurate heights and water levels can be useful to coastal communities to increase resilience to coastal storms and inundation.
- Nuisance flooding gets lots of attention:: A recently released report from our partners at CO-OPS titled (Sea level rise and nuisance flood frequency changes around the United States) highlights the exponential increase in nuisance flooding across the Atlantic seaboard and Gulf Coast over the past several decades. The lead author, CO-OPS' Dr. William Sweet, explained the report's findings in an interview on NPR titled "Climate Change worsens flooding from high tides".
    - The authors of the CO-OPS report also consulted with the Union of Concerned Scientists who have released a companion publication titled "Encroaching Tides."
    - Reuters has also chimed in on this topic with a series of articles and interactive web tools called "Water's Edge: the crisis of rising sea levels"

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